Exploring the Role of Efficacy Accessibility in Risk Behavior

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Abstract

The present research examined whether individuals differ in the accessibility of beliefs about their ability to avoid risky behavior. A new reaction time measure, based on previous measures of accessible attitudes and norms, was developed to quantify the accessibility of chronic self-efficacy. Findings suggest that the accessibility of efficacy related to risky and anti-risk behavioral intentions varies across individuals, and is predictive of risk intentions. Additional investigation found that resting levels of anti-risk efficacy moderate the relationship between risky peer norm accessibility and risk intentions, such that those with accessible risky peer norms who can more easily bring to mind that they can refuse to engage in risk behavior are less likely to form risky intentions.

Keywords: Accessibility, efficacy, health campaigns, norms, attitudes

Exploring the Role of Efficacy Accessibility in Risk Behavior

A new measure was developed to quantify the accessibility of efficacy beliefs. Through three different reaction time tasks and a series of behavioral, attitudinal, and normative measures, the present research demonstrates that the chronic accessibility of attitudes, normative beliefs, and efficacy independently contribute to risky intentions among university students. Taken together, these findings suggest that, while more accessible pro-risk norms and attitudes predict greater likelihood of risky behavior, greater accessibility of anti-risk self-efficacy is associated with reduced risky intentions. These findings encourage further research into the potential to craft anti-risk campaign messages that increase the accessibility of efficacy beliefs seeking to reduce risky behavior among college students.

Study purpose

The present research examined whether or not individuals differ in the accessibility of beliefs about their ability to avoid risky behavior. A new reaction time measure based on previous measures of accessible attitudinal and normative beliefs was developed to quantify the accessibility of chronic self-efficacy. In this context, chronic accessibility means that a particular norm, attitude, or efficacy belief about a behavior is quickly and easily brought to mind, whether or not the behavior is being performed at the moment. The study builds on prior work demonstrating that the ease with which an individual can bring into working memory norms and attitudes related to risky behavior can bias message processing (Rhodes, Ralston, & Bigsby, in press; Rhodes, Roskos-Ewoldsen, Edison, & Bradford, 2008), can drive spontaneous behavioral decision-making (Rhodes, Ewoldsen, Shen, Monahan, & Eno, 2014), and is more predictive of risk behavior than simply the presence of risky norms and attitudes in memory (Rhodes & Ewoldsen, 2009).

Research demonstrating the importance of norms, attitudes, and efficacy beliefs in explaining health-related risk behavior has a long history in the social psychology and communication disciplines. Much has been written about both the deliberative and more spontaneous processes associated with risky behavioral intentions and behavior (e.g., Bandura, 1977; Cialdini & Trost, 1998; Crano & Prislin, 2006; Fazio, 1986, 1990; Fishbein & Ajzen, 1975; Gibbons & Gerrard, 1995; Park, Klein, & Smith, 2009; Petty, Wheeler, & Bizer, 2000; Witte, 1992). Additional research on accessibility (e.g., Cialdini, Kallgren, & Reno, 1991; Cialdini, Reno, & Kallgren, 1990; Rhodes & Ewoldsen, 2009; Roskos-Ewoldsen, Arpan-Ralstin, & St. Pierre, 2002) suggests that the specific attitude or norm most likely to guide behavior in a given context is the one that is most salient at the time, whether this effect is due to priming, chronic accessibility, expectations, or elaboration (Roskos-Ewoldsen et al., 2002; Roskos-Ewoldsen, Yu, & Rhodes, 2004).

Methods

Attitude and norm accessibility methodologies assess how easily some attitudinal or normative information can be accessed in memory over other information, which is indexed by comparative response speeds when making evaluative judgments and multiplied by -1 or 1 to differentiate between negatively and positively valenced evaluative judgments (Rhodes & Ewoldsen, 2009). The accessibility of this evaluative information is then assumed to influence how messages are processed (Rhodes et al., 2008).

In the present research, the accessibility of norms, attitudes, and efficacy beliefs were assessed using reaction time tasks that asked participants to respond as quickly as possible to a series of words related to a variety of beliefs and behaviors, including four risk behaviors related

to alcohol, marijuana, cigarette smoking, and driving). Participants performed three such tasks, one assessing norm accessibility, one attitude accessibility, and one efficacy accessibility. Following completion of these tasks, they answered a series of questions regarding their attitudes toward and perceived norms about the four risk behaviors, their present behavior, and their future risky intentions.

The assumption underlying reaction time tasks is that if the selection of a response requires the use of information that is in memory, the latency of the response will reveal something about the accessibility of the construct in memory, i.e., faster responses correspond to items that are more accessible in memory (Sternberg, 1966). These assumptions relate to network models of memory in which stronger associations are believed to reflect closer semantic links in memory (i.e., pathways traversed as the mind associates closely or distantly connected concepts) than weaker associations and therefore are more easily brought to mind because the search in memory takes less time (Roskos-Ewoldsen et al., 2002). For example, the word "nurse" may have a closer semantic association with "doctor" than it does with "health," although both "doctor" and "health" are related to "nurse" in memory. One important consideration is that participants should be native speakers of the language to maximize the likelihood that the strength of associations in memory are internalized and therefore variations in reaction time speeds or interpretations of the stimuli are not affected by translation issues.

Participants were 177 native English-speaking undergraduate students enrolled in communication courses (M_{age} = 20.66, SD_{age} = 4.57; 61% female; 81% Caucasian, 6% black/African-American, 13% Asian, Hispanic, American-Indian/Alaska native, and other). See Table 1 for means and standard deviations for all variables used in the analyses reported below.[1]

[1] Zero-order correlations between all study variables can be obtained from the lead author.

Norm accessibility. In the norm accessibility task, participants were shown a descriptor of a person likely to be important in their lives (e.g., parent, friend, sibling, boyfriend or girlfriend) and told to generate a mental image of this person. They were also told that if they did not have that particular person in their lives they should imagine an individual who closely fulfills that role for them. Participants were then shown, one by one, a series of risky (e.g., getting drunk, running a red light, smoking a joint), non-risky (e.g., exercising, sleeping late, eating vegetables), and efficacy-related (e.g., refusing a drink, obeying the speed limit) behaviors and were asked to press the "yes" or "no" key indicating whether they thought the important person would want them to perform that behavior.

The speed with which participants respond "yes" or "no" to these prompts is the reaction time. The inverse of this response time (to adjust for skewness) is then multiplied by 1 if their response was "yes" and -1 if their response was "no" to form a variable quantifying valenced speed of response. The valenced speed of response indexes how accessible a particular norm is to each individual. For example, if an individual has a highly accessible norm that his or her parent does not approve of him or her drinking alcohol, his or her response time will have a negative value that is much closer to zero than an individual who has a less accessible parental norm that drinking alcohol is inappropriate. Conversely, an individual who has a highly accessible norm related to his or her good friend approving of drinking alcohol will have a positive reaction time that is much closer to zero than an individual who has a less accessible norm about his or her good friend approving of drinking alcohol.

In the present study, valenced reaction times related to the four risk behaviors (two items each, e.g., "getting stoned" and "smoking a joint" for marijuana use) were combined and then collapsed across parents (M = -.78, SD = .33), grandparents (M = -.83, SD = .34), and siblings (M

= -.50, *SD* = .56) to form an index of family risk-related norm accessibility (*M* = -.75, *SD* = .31). Valenced reaction times for items related to anti-risk efficacy (one item each, e.g., "refusing a joint" for marijuana use) were combined and then collapsed across parents (*M* = .55, *SD* = .53), grandparents (*M* = .58, *SD* = .56), and siblings (*M* = .32, *SD* = .58) to form an index of family efficacy-related norm accessibility (*M* = .48, *SD* = .39). Non-valenced versions of the non-risky and non-efficacy family items were combined and collapsed in a similar fashion to control for differences in participants' overall speed of response (*M* = 1.14, *SD* = .19).

The same procedure was used with best friend (risky, *M* = -.29, *SD* = .57; efficacy, *M* = .24, *SD* = .60), friends (risky, *M* = -.11, *SD* = .65; efficacy, *M* = .14, *SD* = .65), and significant other (risky, *M* = -.40, *SD* = .58; efficacy, *M* = .41, *SD* = .58), to form indexes of peer norm accessibility (risky, *M* = -.27, *SD* = .49; efficacy, *M* = .24, *SD* = .43) and overall speed of response (*M* = 1.09, *SD* = .21).

Attitude accessibility. The attitude accessibility task is performed in a similar manner to the norm accessibility measure except that in the attitude accessibility task participants are asked to press the "like" or "dislike" key when a word or phrase representing a risky (e.g., get drunk, run a red light) or non-risky (e.g., laundry, flowers, hip-hop, gas prices, Disney) attitude object flashes across the screen. Again, the inverse of the response time is computed to adjust for skewness and is then multiplied by 1 or -1 to indicate "like" or "dislike," respectively.

Valenced reaction times for accessibility of attitude objects related to risk (two items each, e.g., "get stoned" and "smoke a joint" for marijuana use) were combined to form a single variable quantifying accessibility of risk-related attitudes (*M* = -.37, *SD* = .54). Valenced reaction times for the four anti-risk efficacy items (one item for each risk-related attitude object, e.g., "refuse a joint" for marijuana use) were combined to form an anti-risk efficacy variable (*M* = .22,

SD = .52). Non-valenced versions of the non-risky, non-efficacy attitude objects were combined to form a variable controlling for differences in participants' overall speed of response (non-risky, *M* = 1.10, *SD* = .18).

Efficacy accessibility. The efficacy accessibility task also used the previously described reaction time format and included the same risk-related and efficacy-related items among a series of non-risk and non-efficacy control items. In this task, participants were asked to respond "yes" or "no" to a series of statements (i.e., "I feel confident that I can _____ or "_____ is up to me"; adapted from Ajzen, 2006) regarding belief in their ability to engage in the four risky (e.g., get/getting drunk, smoke/smoking weed, *M* = .46, *SD* = .69), four efficacy-related (refuse/refusing a drink, refuse/refusing a joint, *M* = 1.07, *SD* = .32), and non-risky (e.g., exercise/exercising regularly, lie/lying to my friends, get/getting the flu, *M* = .16, *SD* = .28) behaviors. The risk-related index quantified the accessibility of self-efficacy related to risky behavior (i.e., negative efficacy), the efficacy-related index quantified the accessibility of anti-risk self-efficacy (i.e., positive efficacy), and the non-risky index quantified speed of response.

Prior behavior. Prior behaviors related to alcohol, marijuana, and cigarettes were each assessed with several items related to frequency and quantity of use (e.g., within the last 30 days/within the last week, how many drinks, how many cigarettes). Risky driving behaviors were assessed with items related to frequency of running red lights, speeding, and texting while driving. Two items were averaged to form a variable indexing prior drinking behavior (days within last 30 alcohol was consumed, number of times felt drunk, *r* = .63, *M* = 5.85, *SD* = 4.32); two items indexed prior marijuana use (days within last 30 had at least one hit, number of hits at a time, *r* = .39, *M* = 4.8, *SD* = 7.40); two comprised prior cigarette use (days within last 30 had at least one cigarette, number of cigarettes per day, *r* = .65, *M* = 2.6, *SD* = 3.82); and two formed a

risky driving behavior variable (days within last 30 drove significantly over the speed limit, days within last 30 texted while driving, $r = .50$, $M = 5.99$, $SD = 6.65$).

Attitudes. Attitudes toward the four risky behaviors were each assessed with 11-point, nine-item bipolar adjective scales, e.g., bad/good, foolish/wise, unsafe/safe, with higher numbers corresponding to riskier attitudes (alcohol, $M = 5.9$, $SD = 2.17$; marijuana, $M = 5.14$, $SD = 2.78$; smoking, $M = 1.97$, $SD = 1.27$; driving, $M = 2.85$, $SD = 1.48$).

Descriptive and injunctive norms. Descriptive norms (i.e., norms related to perceptions of what is common practice in one's environment) related to each risk behavior were assessed one item asking on how many days participants thought the "typical student" at the university engaged in that behavior within the last 30 days (e.g., drank at least one drink of alcohol, smoked at least one cigarette, etc.). Injunctive norms (i.e., norms related to the perception that important others would approve or disapprove of specific behaviors) related to each risk behavior were assessed one item asking how many among their "close circle of friends" engaged in each risky behavior fairly regularly (i.e., "never," "less than half," "about half," "more than half," or "all of them"). The four risk-related items for each type of norm were then combined to form an index of risky descriptive ($M = 11.35$, $SD = 6.42$) and risky injunctive ($M = 2.51$, $SD = .68$) norms.

Behavioral intention. Behavioral intentions were assessed with two to three items each related to the four risky behaviors. Each item was assessed on an 11-point scale ranging from *very unlikely* to *very likely*. The critical alcohol item was, "The next time you [are out with your friends], how likely is it that you will get drunk?" ($M = 6.47$, $SD = 3.72$); the marijuana item was, "The next time you are out with your friends, how likely is it that you will smoke marijuana?" ($M = 2.77$, $SD = 2.97$); cigarette-smoking items included, "The next time you [are out with your friends/party with your friends], how likely is it that you will [have a drag off of a

cigarette/bum a cigarette and smoke it/smoke more than one cigarette]?" (M = 1.70, SD = 1.70, a = .83); risky driving items included, "The next time you [drive a motor vehicle/are out with your friends], how likely is it that you will [drive significantly over the speed limit/text while driving/run a red light]?" (M = 3.77, SD = 2.00, a = .76). These four sets of items were collapsed into a single variable quantifying risky behavioral intention (M = 3.27, SD = 1.38, a = .68).

Results

We first conducted a hierarchical regression to quantify the influence of risky (i.e., negative) and anti-risk (positive) efficacy on risky behavioral intention (see Table 2). Gender, age, and race (dichotomous white/non-white, M = .19, SD = .39) were entered at the first step, with the overall model not significant and no variables significantly predicting risky intentions. However, risky and anti-risk efficacy contributed significantly at the second step, $F(6, 160) = 2.75$, $p = .01$, $R^2 = .09$, with both risky and anti-risk efficacy contributing significantly to the model. Further, the coefficient signs for both efficacy variables were in their expected directions, i.e., greater anti-risk efficacy was associated with reduced risky intentions, $b = -1.16$, $t(160) = -2.74$, $p = .01$, and greater accessiblity of risky efficacy corresponded to increased risky intentions, $b = .43$, $t(160) = 2.58$, $p = .01$. The variable quantifying speed of response, also entered at the second step, was nonsignificant, as expected.

Next, we investigated whether the accessibility of risky and anti-risk efficacy predicts risky intentions when considered alongside accessibility variables related to risky and anti-risk norms and attitudes. Family and peer norm accessibility, related to both risky and anti-risk behaviors, were entered at the third step along with the appropriate speed of response control variables. The model was significant, $F(12, 154) = 9.21$, $p < .001$, $\Delta R^2 = .32$. Risky peer norm accessibility predicted greater risky intentions, $b = 1.54$, $t(154) = 7.49$, $p < .001$, but anti-risk

peer norms did not predict less risky intentions, $p = .08$. Interestingly, risky family norms did not predict behavior, $p = .77$, but anti-risk family norms did, such that more accessible anti-risk family norms were associated with *increased* risky intentions, $b = .65$, $t(154) = 2.61$, $p = .01$. The accessibility of risky efficacy was no longer a significant predictor of future risky intentions when considered alongside the accessibility of peer and family norms, but anti-risk efficacy remained a significant predictor of reduced risky intentions, $b = -.71$, $t(154) = -1.96$, $p = .05$. Risky and anti-risk attitude accessibility variables, entered along with their appropriate response speed control, contributed significantly at the fourth step, $F(15, 151) = 9.04$, $p < .001$, $\Delta R^2 = .06$. Of these variables, only risky attitude accessibility predicted behavior, such that greater accessible attitudes toward risk predicted increased risky intentions, $b = .77$, $t(151) = 3.57$, $p < .001$. Risky peer norm and anti-risk family norm accessibility remained significant at this step, but anti-risk efficacy accessibility was no longer significant.

We then conducted individual analyses of each risk behavior and its associated efficacy accessibility to investigate whether efficacy mediates the relationship between prior behavior and future risky intentions. Such a relationship would suggest that efficacy accessibility is a mechanism through which prior risk behavior exerts its effects on risky intentions. We expected that greater accessibility of risky efficacy would mediate the prior-future behavior relationship in such a way that prior risky behavior would lead to greater efficacy to perform the risky behavior, and that this greater risky efficacy would translate to higher risky intentions. However, we were primarily interested in exploring if greater accessibility of anti-risk efficacy might reduce risky intentions. Evidence of this relationship would bode well for health interventions aiming to increase anti-risk efficacy as a method of reducing risky behavior. We used PROCESS model 4 with 1,000 bootstrapped samples (Hayes, 2013) and results were consistent across all four

behaviors: Neither accessibility of efficacy for performing the risky behavior nor for preventing risky behavior mediated the relationship between prior risky behavior and risky intentions, all *p*s > .05.

We then reasoned that the more accessible anti-risk efficacy is in working memory, the more likely it might be to mitigate risky behavioral intentions that are spurred on by accessible risky norms and attitudes. Conversely, the greater the presence of risky efficacy in working memory, the more likely it may be to facilitate risky intentions when risky norms and attitudes are activated. To investigate these relationships, we conducted three separate hierarchical regressions to examine risky and anti-risk efficacy accessibility as moderators of the relationship between accessible risky norms or atittudes and risky intentions. The first regression examined the efficacy accessibility variables as moderators of risky attitude accessibility, the second risky peer norms, and the third risky family norms. We used an identical procedure for each regression. We first entered gender, age, and the dichotomous race variable at step 1; then risky and anti-risk efficacy accessiblity and the reaction time control variable at step 2; the risky norm/attitude variable and its associated reaction time control variable at step 3; and finally, at step 4, one interaction term quantifying pro-risk efficacy x risky norm/attitude and the other anti-risk efficacy x risky norm/attitude. Of these analyses, only risky peer norms (see Table 3) showed a significant moderation, but in a promising direction: Accessible anti-risk efficacy significantly reduced the impact of accessible risky peer norms on risky intentions, $b = -1.83$, $t(159) = -2.75$, $p = .01$. Further, pro-risk efficacy did not enhance the influence of risky peer norms on risky intentions, $p = .71$.

Discussion

The present study demonstrates that the accessibility of efficacy related to risky and anti-risk behavioral intentions varies across individuals, and is predictive of risky intentions. This finding complements prior work demonstrating that the accessibility of risky norms and attitudes predicts risk behavior (e.g., Rhodes & Ewoldsen, 2009; Rhodes et al., 2008, 2014; Roskos-Ewoldsen et al., 2002, 2004). However, these results suggest that efficacy accessibility accounts for only a small percentage of the variance in risky behavioral intentions when compared to its norm and attitude counterparts. We did not find evidence that efficacy accessibility mediates the relationship between prior behavior and future risky intentions, but perhaps this is to be expected given that we did not manipulate efficacy, norm, or attitude accessibility but rather assessed existing levels. Additional investigation did find that resting levels of anti-risk efficacy moderate the relationship between risky peer norm accessibility and risky intentions, such that those with accessible risky peer norms who can more easily bring to mind that they can refuse to engage in risk behavior are less likely to form risky intentions. This finding is promising given the well-documented influence peers have on risk behavior (e.g., Albert, Chein, & Steinberg, 2013; Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; Gardner & Steinberg, 2005; Maxwell, 2002). It remains to be explored if the accessibility of anti-risk efficacy can be increased over and above that of risky efficacy to reduce intentions to engage in future risky behavior.

The present study establishes the existence and validity of the efficacy accessibility construct. The next step is to explore ways in which efficacy accessibility can be manipulated through targeted interventions that also seek to reduce risky norms and attitudes.

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Table 1. Descriptive statistics for all study variables (unstandardized).

	M (*SD*)
Age	20.59 (4.57)
Gender	.39 (.49)
Race (dich.)	.19 (.39)
Efficacy accessibility reaction time control	1.03 (.19)
Efficacy accessibility risky	.46 (.69)
Efficacy accessibility anti-risk	1.07 (.32)
Family norm accessibility reaction time control	1.14 (.19)
Peer norm accessibility reaction time control	1.09 (.21)
Risky family norm accessibility	-.75 (.31)
Anti-risk family norm accessibility	.48 (.39)
Risky peer norm accessibility	-.27 (.49)
Anti-risk peer norm accessibility	.24 (.43)
Attitude accessibility reaction time control	1.10 (.18)
Risky attitude accessibility	-.37 (.54)
Anti-risk attitude accessibility	.22 (.52)
Risky efficacy X risky family norm	-.32 (.60)
Anti-risk efficacy X risky family norm	-.81 (.43)
Risky efficacy X risky peer norm	-.08 (.47)
Anti-risk efficacy X risky peer norm	-.29 (.57)
Risky efficacy X risky attitude	-.14 (.57)
Anti-risk efficacy X risky attitude	-.43 (.62)
Prior drinking behavior	5.85 (4.32)
Prior marijuana use	4.81 (7.39)
Prior cigarette smoking	2.61 (3.82)
Prior driving behavior	5.99 (6.65)
Behavior intention: drinking	6.47 (3.72)
Behavior intention: marijuana	2.77 (2.97)
Behavior intention: cigarettes	1.70 (1.70)
Behavior intention: driving	3.77 (2.00)
Risky behavioral intention (combined)	3.27 (1.38)

*p<.05, **p<.01,***p<.001

Table 2. Hierarchical regression of efficacy, norm, and attitude accessibility on risky behavioral intentions.

	B	*SE*	*b*	*t*
Gender	-.30	.19	-.11	-1.60
Age	.04	.02	.12	1.88
Race	-.10	.22	-.03	-.43
Efficacy acc. RT control	1.02	.62	.14	1.64
Anti-risk efficacy acc.	-.53	.35	-.12	-1.50
Risky efficacy acc.	.21	.14	.11	1.54
Family norm acc. RT control	.97	.77	.14	1.27
Peer norm acc. RT control	-1.12	.69	-.17	-1.63
Risky family norm acc.	-.09	.35	-.02	-.24
Risky peer norm acc.	1.00	.25	.36	4.07***
Anti-risk family norm acc.	.57	.24	.16	2.36*
Anti-risk peer norm acc.	-.22	.25	-.07	-.89
Attitude acc. RT control	-.73	.69	-.09	-1.06
Risky attitude acc.	.77	.22	.31	3.57***
Anti-risk attitude acc.	-.20	.18	-.08	-1.09

*p<.05, **p<.01,***p<.001
RT = reaction time

Table 3. The accessibility of anti-risk efficacy moderates the relationship between risky peer norm accessibility and risky behavioral intentions.

	B	*SE*	*b*	*t*
Gender	-.32	.19	-.11	-1.74
Age	.04	.02	.12	1.88
Race	-.24	.22	-.07	-1.06
Efficacy acc. RT control	.82	.56	.11	1.48
Risky efficacy acc.	.07	.18	.03	.37
Anti-risk efficacy acc.	-1.17	.39	-.27	-3.02**
Peer norm acc. RT control	-1.00	.50	-.15	-2.01*
Risky peer norm acc.	3.54	.72	1.27	4.89***
Risky eff. X risky peer norm	-.11	.30	-.04	-.37
Anti-risk eff. X risky peer norm	-1.83	.67	-.75	-2.75*

*p<.05, **p<.01,***p<.001
RT = reaction time